PATENT
Customer No. 22,852
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Amendments to the Claims:

The following listing of claims replaces all prior versions of the claims and all prior listings of the claims in the present application. Please amend claim 49 as follows:

Claims 1-28 (canceled)

Claim 29 (previously presented): A method for determining at least one parameter of a periodic spin function $\alpha(z)$ with period p, to be applied to an optical fibre along its length z, comprising:

selecting said at least one parameter so that

$$\frac{\left|\int_0^p y_1(z,\alpha'(z))dz\right|}{\int_0^p |y_1(z,\alpha'(z))|dz} \le \varepsilon_1$$

where ϵ_1 is about 0.05 and y_1 is the first of the three components $y_1(z)$, $y_2(z)$, $y_3(z)$ of a periodic function $\bar{y}(z)$ of period p such that

$$\frac{dy_1}{dz} = 2\alpha'(z)y_2$$
$$\frac{dy_2}{dz} = -\frac{2\pi}{L_B}y_3 - 2\alpha'(z)y_1$$
$$\frac{dy_3}{dz} = \frac{2\pi}{L_B}y_2$$

where L_B is an expected beat length of said optical fibre and $\alpha'(z)$ is the derivative of the spin function $\alpha(z)$ with respect to the length z.

Claim 30 (previously presented): A method for making an optical fibre comprising:

(a) heating a fibre preform to a drawing temperature;

(b) providing a periodic spin function $\alpha(z)$ with period p > 2 m; and

(c) drawing said optical fibre from said preform, while simultaneously creating a relative spin between said optical fibre and said preform with said spin function;

step (b) further comprising selecting said spin function so that

$$\frac{\left|\int_0^p y_1(z,\alpha'(z))dz\right|}{\int_0^p \left|y_1(z,\alpha'(z))\right|dz} \leq \varepsilon_1$$

where ϵ_1 is about 0.05 and y_1 is the first of the three components $y_1(z)$, $y_2(z)$, $y_3(z)$ of a periodic function $\bar{y}(z)$ of period p such that

$$\frac{dy_1}{dz} = 2\alpha'(z)y_2$$
$$\frac{dy_2}{dz} = -\frac{2\pi}{L_B}y_3 - 2\alpha'(z)y_1$$
$$\frac{dy_3}{dz} = \frac{2\pi}{L_B}y_2$$

where L_B is an expected beat length of said optical fibre and $\alpha'(z)$ is the derivative of the spin function $\alpha(z)$ with respect to the length z.

Claim 31 (previously presented): A method as in claim 30, wherein p is lower than 20 m.

Claim 32 (previously presented): A method as in claim 30, wherein L_B is greater than 0.5 m.

Claim 33 (previously presented): A method as in claim 32, wherein L_B is greater than 5 m.

Claim 34 (previously presented): A method as in claim 30, wherein an amplitude A of said spin function is lower than 50 turns/m.

Claim 35 (previously presented): A method as in claim 34, wherein A is lower than 10 turns/m.

Claim 36 (previously presented): A method as in claim 34, wherein A is greater than 3 turns/m.

Claim 37 (previously presented): A method as in claim 34, wherein a ratio between an amplitude A and a distance r between two inversion sites of said spin function is lower than 10 turns/m^2.

Claim 38 (previously presented): A method as in claim 30, wherein said step of drawing is performed at a drawing speed not lower than 5 m/s.

Claim 39 (previously presented): A method for making an optical fibre having NA ≥ 0.2 comprising:

(a) heating a fibre preform to a drawing temperature;

(b) providing a periodic spin function $\alpha(z)$ with period p; and

(c) drawing said optical fibre from said preform, while simultaneously creating a relative spin between said optical fibre and said preform with said spin function;

step (b) further comprising selecting said spin function so that

$$\frac{\left|\int_0^p y_1(z,\alpha'(z))dz\right|}{\int_0^p |y_1(z,\alpha'(z))|dz} \leq \varepsilon_1$$

where ϵ_1 is about 0.05 and y_1 is the first of the three components $y_1(z)$, $y_2(z)$, $y_3(z)$ of a periodic function $\bar{y}(z)$ of period p such that

$$\frac{dy_1}{dz} = 2\alpha'(z)y_2$$
$$\frac{dy_2}{dz} = -\frac{2\pi}{L_B}y_3 - 2\alpha'(z)y_1$$
$$\frac{dy_3}{dz} = \frac{2\pi}{L_B}y_2$$

where L_B is an expected beat length of said optical fibre and $\alpha'(z)$ is the derivative of the spin function $\alpha(z)$ with respect to the length z.

Claim 40 (previously presented): A method as in claim 39, wherein L_B is lower than 5 m.

Claim 41 (previously presented): A method as in claims 29, 30 or 39, wherein $p<L_B$.

Claim 42 (previously presented): A method as in claims 29, 30 or 39, wherein ϵ_1 is about 0.01.

Claim 43 (previously presented): A method as in claim 42, wherein ϵ_1 is about 0.008.

Claim 44 (previously presented): A method as in claim 43, wherein ϵ_1 is about 0.002.

Claim 45 (previously presented): A method as in claims 29, 30 or 39, wherein said spin function is a sinusoidal function.

Claim 46 (previously presented): A method as in claims 29, 30 or 39, wherein said spin function is a triangular function.

Claim 47 (previously presented): A method as in claims 29, 30 or 39, wherein said spin function is a trapezoidal function.

Claim 48 (previously presented): An optical fibre comprising at least a section having a beat length L_B and a periodic spin function $\alpha(z)$ with period p > 2 m impressed therein,

said spin function being such that

$$\frac{\left|\int_0^p y_1(z,\alpha'(z))dz\right|}{\int_0^p |y_1(z,\alpha'(z))|dz} \le \varepsilon_1$$

where ε_1 is about 0.05 and y_1 is the first of the three components $y_1(z)$, $y_2(z)$, $y_3(z)$ of a periodic function $\vec{y}(z)$ of period p such that

$$\frac{dy_1}{dz} = 2\alpha'(z)y_2$$
$$\frac{dy_2}{dz} = -\frac{2\pi}{L_B}y_3 - 2\alpha'(z)y_1$$
$$\frac{dy_3}{dz} = \frac{2\pi}{L_B}y_2$$

and $\alpha'(z)$ is the derivative of the spin function $\alpha(z)$ with respect to the length z.

Claim 49 (currently amended): An optical fibre as in claim 48, wherein said optical fibre has a PMD coefficient, and said PMD coefficient is lower than or equal to 0.05 ps/[[mk]]km$^{1/2}$.

Claim 50 (previously presented): An optical fibre as in claim 48, wherein a length of said section of optical fibre is higher than or equal to 10 times the period p of the spin function.

Claim 51 (previously presented): An optical fibre having NA ≥ 0.2, comprising at least a section having a beat length L_B and a periodic spin function $\alpha(z)$ with period p impressed therein,

said spin function being such that

$$\frac{\left|\int_0^p y_1(z,\alpha'(z))dz\right|}{\int_0^p |y_1(z,\alpha'(z))|dz} \leq \varepsilon_1$$

where ϵ_1 is about 0.05 and y_1 is the first of the three components $y_1(z)$, $y_2(z)$, $y_3(z)$ of a periodic function $\bar{y}(z)$ of period p such that

$$\frac{dy_1}{dz} = 2\alpha'(z)y_2$$
$$\frac{dy_2}{dz} = -\frac{2\pi}{L_B}y_3 - 2\alpha'(z)y_1$$
$$\frac{dy_3}{dz} = \frac{2\pi}{L_B}y_2$$

and $\alpha'(z)$ is the derivative of the spin function $\alpha(z)$ with respect to the length z.

Claim 52 (previously presented): An optical fibre having a length lower than 1 km, comprising at least a section having a beat length L_B and a periodic spin function $\alpha(z)$ with period p impressed therein,

said spin function being such that

$$\frac{\left|\int_0^p y_1(z,\alpha'(z))dz\right|}{\int_0^p |y_1(z,\alpha'(z))|dz} \leq \varepsilon_1$$

where ϵ_1 is about 0.05 and y_1 is the first of the three components $y_1(z)$, $y_2(z)$, $y_3(z)$ of a periodic function $\bar{y}(z)$ of period p such that

$$\frac{dy_1}{dz} = 2\alpha'(z)y_2$$
$$\frac{dy_2}{dz} = -\frac{2\pi}{L_B}y_3 - 2\alpha'(z)y_1$$
$$\frac{dy_3}{dz} = \frac{2\pi}{L_B}y_2$$

and $\alpha'(z)$ is the derivative of the spin function $\alpha(z)$ with respect to the length z.

Claim 53 (previously presented): An optical fibre as in claim 52, wherein said fibre length is lower than 500 m.

Claim 54 (previously presented): An optical fibre as in claim 52, wherein said fibre length is lower than 200 m.

Claim 55 (previously presented): An optical telecommunication system comprising:

an optical transmission line;

at least one transmitter for adding a signal to said transmission line; and

at least one receiver for receiving said signal from said transmission line;

said transmission line comprising at least one optical fibre according to any one of claims 48 to 54.

Claim 56 (previously presented): An article comprising at least one optical fibre according to any one of claims 48 to 54.